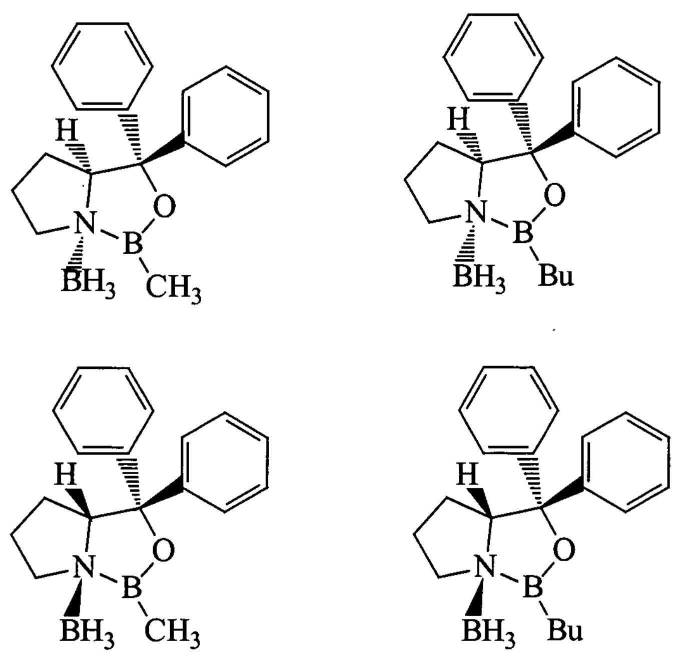
CLAIMS:

1. A method for stereoselectively reducing an unsaturated alkyl ketone substituent attached to a fused ring base, comprising:

reacting the unsaturated alkyl ketone with a chiral oxazaborolidine reagent to stereoselectively reduce the unsaturated alkyl ketone to an unsaturated alkyl alcohol.

2. A method according to claim 1, wherein the fused ring base is a steroid ring base.

3. A method according to claim 1, wherein the chiral oxazaborolidine reagent includes a member selected from the group consisting of the following compounds:



4. A method according to claim 1, further including reducing the unsaturated alkyl alcohol to produce a saturated alkyl alcohol.

5. A method for stereoselectively reducing an alkeneone substituent attached to a fused ring base, comprising:

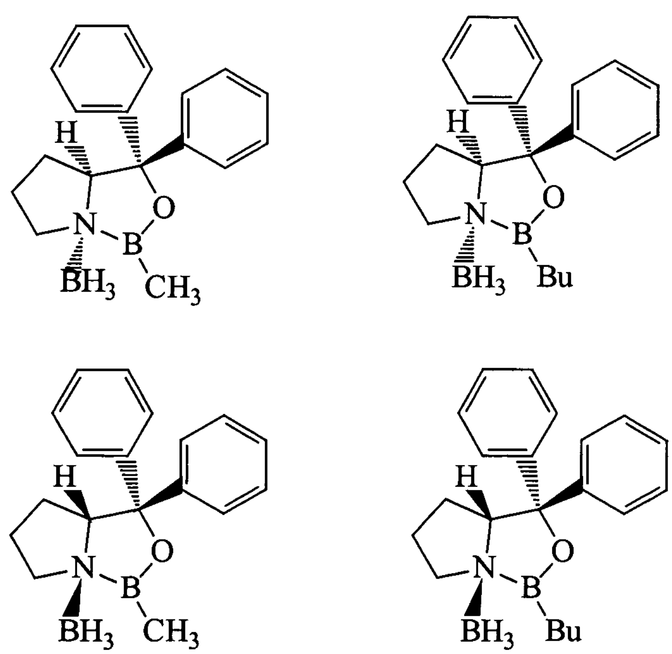
reacting the alkeneone with a chiral oxazaborolidine reagent to stereoselectively reduce the alkeneone to an allylic alcohol.

6. A method according to claim 5, wherein the fused ring base is a steroid ring base, and the alkeneone substituent is a 22-ene-24-one substituent on the steroid ring base.

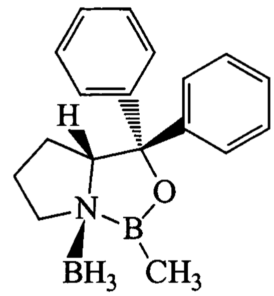
7. A method according to claim 6, wherein, prior to the reacting step, the 22-ene-24-one substituent is produced from a C-22 aldehyde substituent on the steroid ring base.

8. A method according to claim 7, wherein the aldehyde substituent is reacted with a Wittig reagent to produce the 22-ene-24-one substituent on the steroid ring base.

9. A method according to claim 5, wherein the chiral oxazaborolidine reagent includes a member selected from the group consisting of the following compounds:



10. A method according to claim 5, wherein the chiral oxazaborolidine reagent is:



11. A method according to claim 5, further including reducing the allylic alcohol to produce a hydroxylated, saturated alkane substituent on the fused ring base.

12. A method for stereoselectively reducing an alkyneone substituent attached to a fused ring base, comprising:

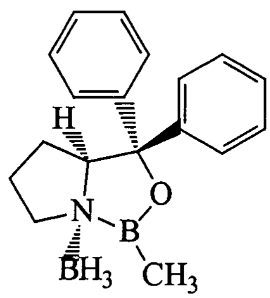
reacting the alkyneone with a chiral oxazaborolidine reagent to stereoselectively reduce the alkyneone to a propargyllic alcohol.

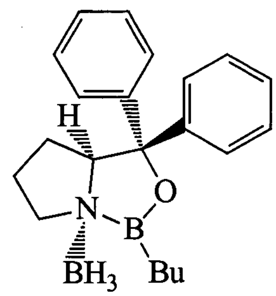
13. A method according to claim 12, wherein the fused ring base is a steroid ring base, and the alkyneone is a 22-yne-24-one substituent on the steroid ring base.

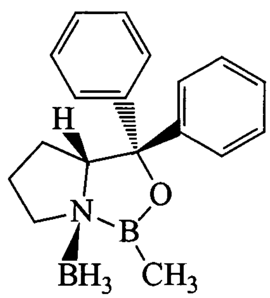
14. A method according to claim 13, wherein, prior to the reaction step, the 22-yne-24-one substituent is produced from a C-22 aldehyde on the steroid ring base.

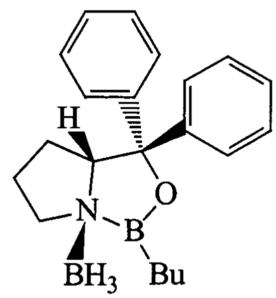
15. A method according to claim 14, wherein the aldehyde is reacted to produce a 22-alkyne substituent on the steroid ring base, and the 22-alkyne substituent is reacted with a lithium containing reagent and anhydride to produce the 22-yne-24-one substituent on the steroid ring base.

16. A method according to claim 12, wherein the chiral oxazaborolidine reagent includes a member selected from the group consisting of the following compounds:

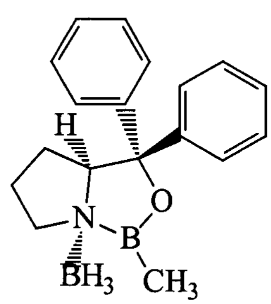






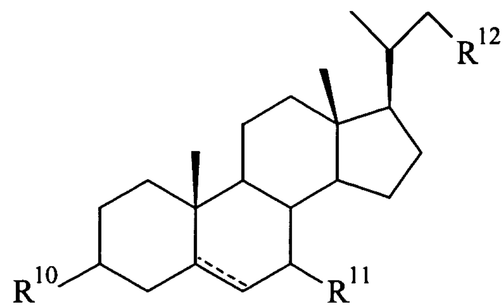


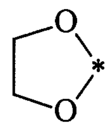
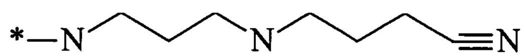
17. A method according to claim 12, wherein the chiral oxazaborolidine reagent is:

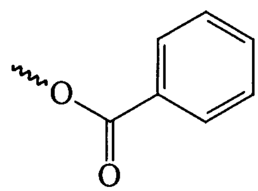


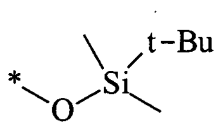
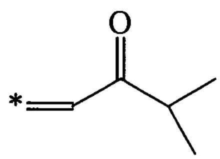
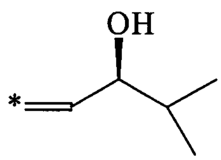
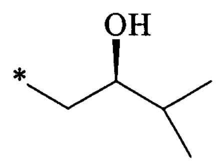
18. A method according to claim 12, further including reducing the propargyllic alcohol to produce a hydroxylated, saturated alkane substituent on the fused ring base.

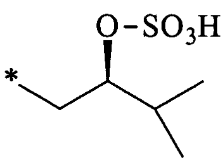
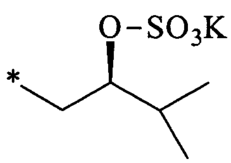
19. An intermediate in the synthesis of squalamine or a homologous aminosterol having the composition:



wherein R^{10} is O=, , or 

R^{11} is H, O=, , or ;

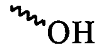
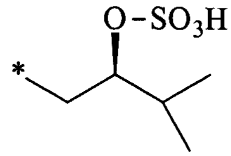
R^{12} is OH, , O=, , , ,

, or ;

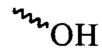
 represents either a single or double bond; and

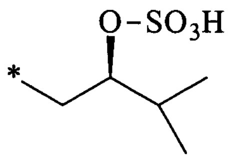
* represents the location where the R^{10} or R^{12} moieties are bonded to the remainder of the steroid molecule.

20. The intermediate according to claim 19, wherein R^{10} is

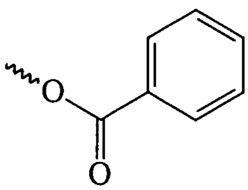
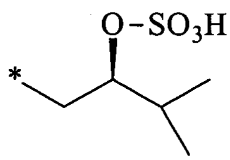
, R^{11} is , R^{12} is , and

 represents a single bond.

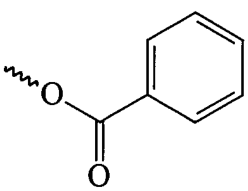
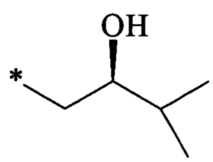
21. The intermediate according to claim 19, wherein R^{10} is O=, R^{11} is , R^{12} is

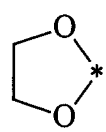
, and  represents a single bond.

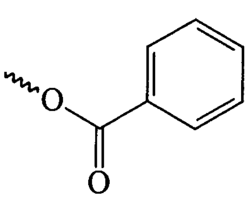
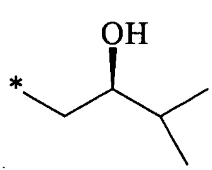
22. The intermediate according to claim 19, wherein R^{10} is O=, R^{11} is

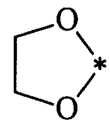
, R^{12} is , and  represents a single bond.

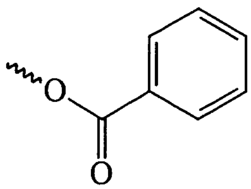
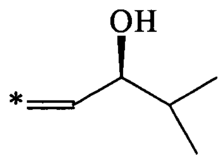
23. The intermediate according to claim 19, wherein R^{10} is O=, R^{11} is

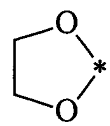
, R^{12} is , and  represents a single bond.

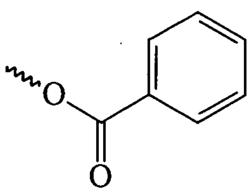
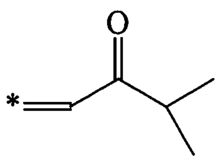
24. The intermediate according to claim 19, wherein R^{10} is , R^{11} is

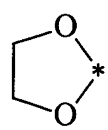
, R^{12} is , and  represents a single bond.

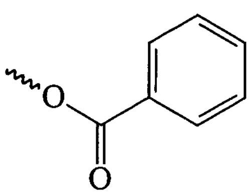
25. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is

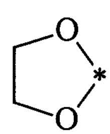
 , R^{12} is  , and  represents a single bond.

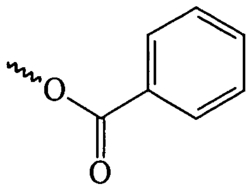
26. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is

 , R^{12} is  , and  represents a single bond.

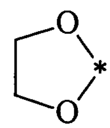
27. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is

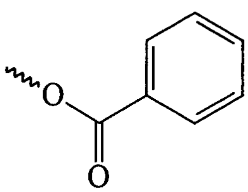
 , R^{12} is O=, and  represents a single bond.

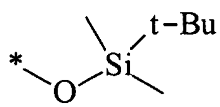
28. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is

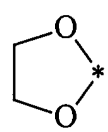


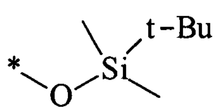
, R^{12} is OH, and  represents a single bond.

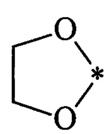
29. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is

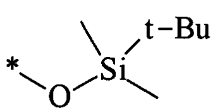


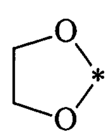
, R^{12} is  , and  represents a single bond.

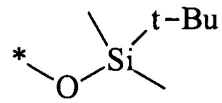
30. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is  ,

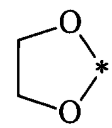
R^{12} is  , and  represents a single bond.

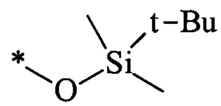
31. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is O=,

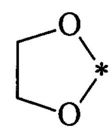
R^{12} is  , and  represents a single bond.

32. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is O=,

R^{12} is  , and  represents a double bond.

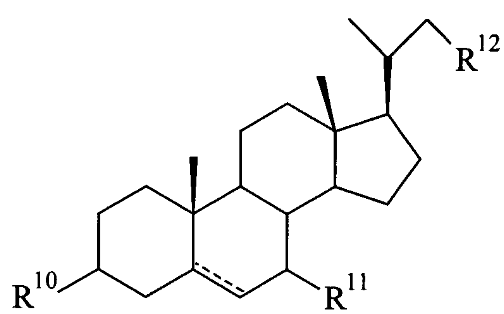
33. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is H,

R^{12} is  , and  represents a double bond.

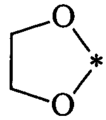
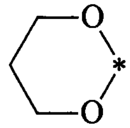
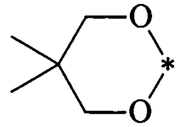
34. The intermediate according to claim 19, wherein R^{10} is  , R^{11} is H, R^{12} is

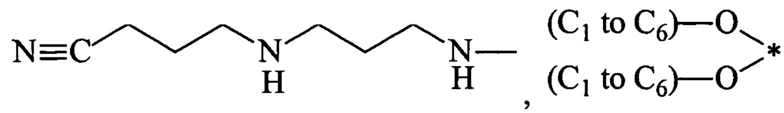
OH, and  represents a double bond.

35. An intermediate in the synthesis of squalamine or a homologous aminosterol having the composition:

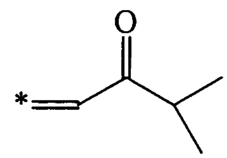
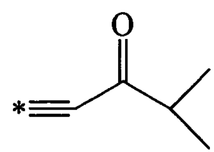
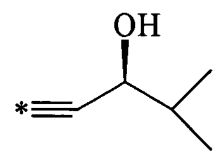
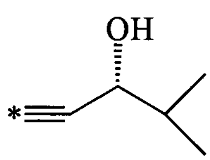
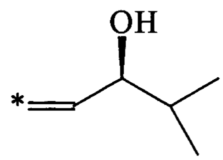
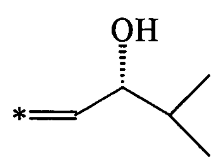
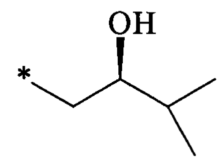
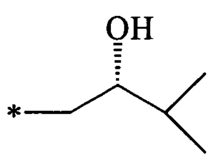
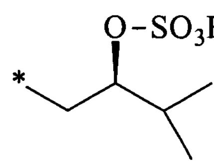
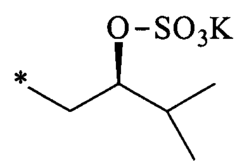
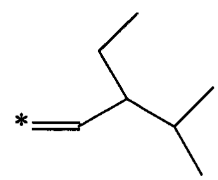


wherein:

R^{10} is O═,  ,  ,  ,

, or ;

R^{11} is H, O═, HO, or R^{13}—O;

R^{12} is OH, —OR^{14}, O═, , , , , , , , , *≡C—H, , ; or 

 represents either a single or double bond;

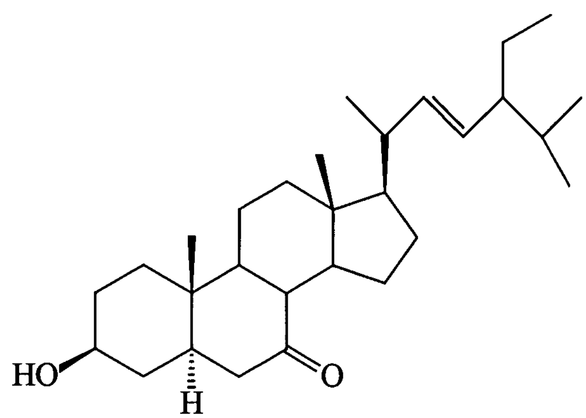
* represents the location where the R^{10} or R^{12} moieties are bonded to the remainder of the steroid molecule;

C_1 to C_6, each independently represents an alkyl, alkenyl, or alkynyl group, having 1 to 6 carbon atoms, wherein the group may be substituted or unsubstituted; and

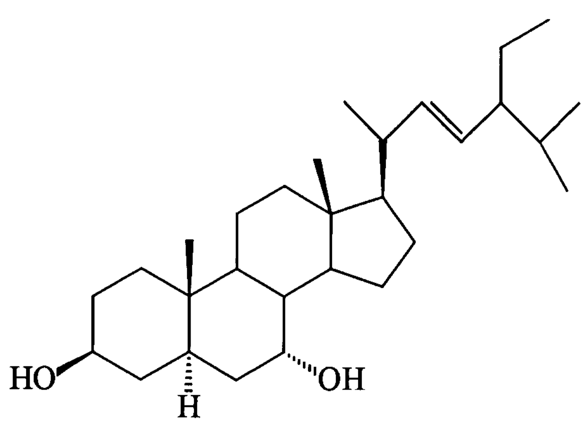
R^{13} and R^{14}, each independently represents formyl; acetyl; propionyl; pivaloyl; cyanoacetyl; benzoyl; benzoyl ortho or para substituted with nitro, halogen, or alkoxy; methoxycarbonyl (methylcarbonate); ethoxycarbonyl; benzyloxycarbonyl; benzyl; benzyl ortho or para substituted with nitro; benzyl para substituted with a halogen; benzyl para substituted

with a methoxy; benzyloxymethyl; benzyloxymethyl ortho or para substituted with nitro; benzyloxymethyl para substituted with a halogen; benzyloxymethyl para substituted with a methoxy; tetrahydrothiopyranyl; tetrahydrothiofuranyl; methylthiomethyl; trialkylsilyl, wherein each alkyl is independently selected from the group of methyl, ethyl, isopropyl, *sec*-butyl, *tert*-butyl, and phenyl; tetrahydropyranyl; 2-methoxyethoxymethyl; and methoxymethyl.

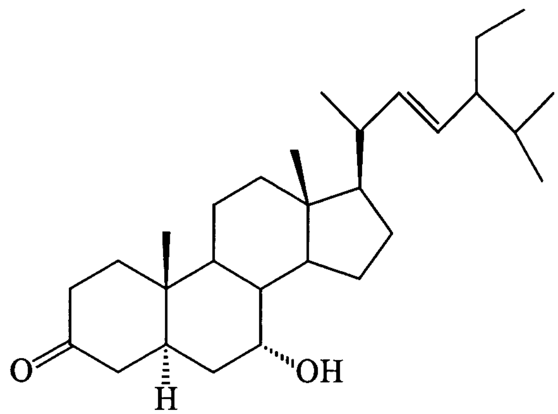
36. The intermediate according to claim 35, having the following composition:



37. The intermediate according to claim 35, having the following composition:

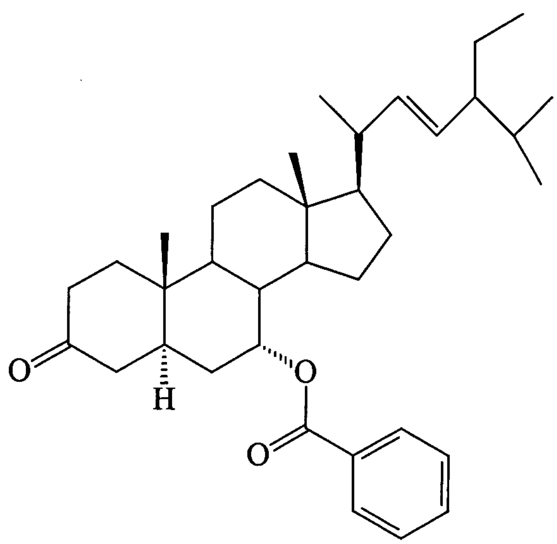


38. The intermediate according to claim 35, having the following composition:



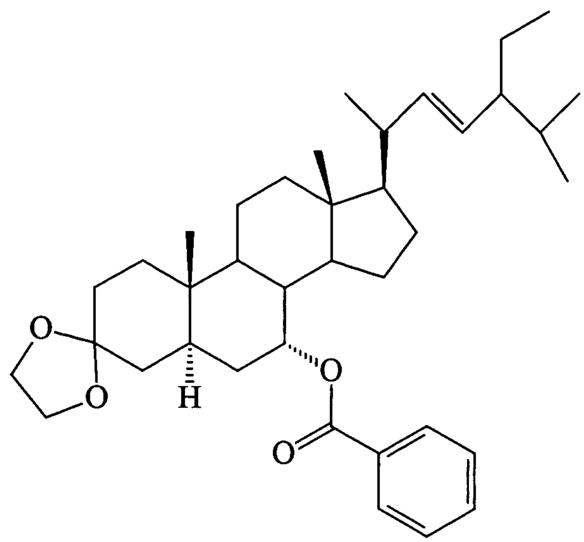
.

39. The intermediate according to claim 35, having the following composition:



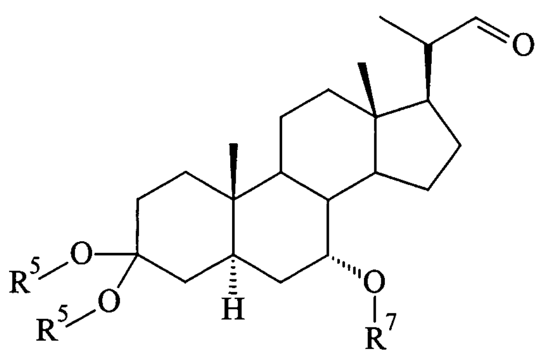
.

40. The intermediate according to claim 35, having the following composition:



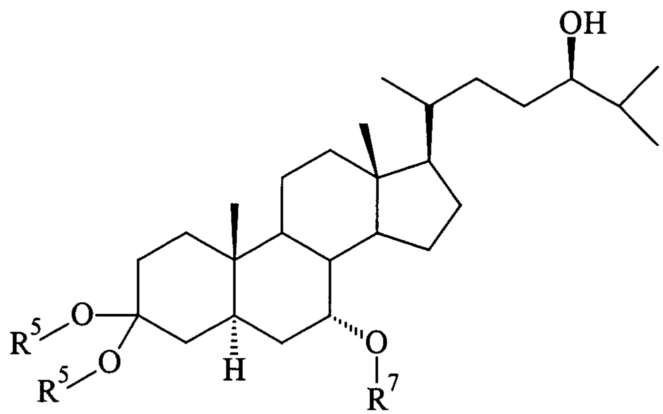
41. A method for producing an aminosterol compound selected from the group consisting of squalamine, compound 1436, and salts thereof, the method comprising:

converting, under sufficient conditions, a compound according to formula 129:



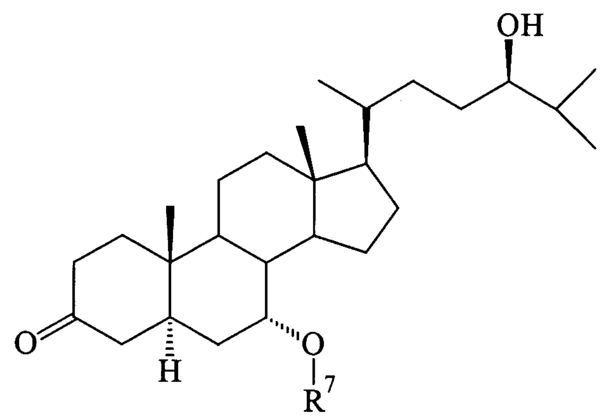
(129),

wherein the R^5 groups are suitable protecting groups that can be the same or different, or the R^5 groups can join together to form a ring structure, and R^7 is a suitable protecting group, to a compound according to formula 134:



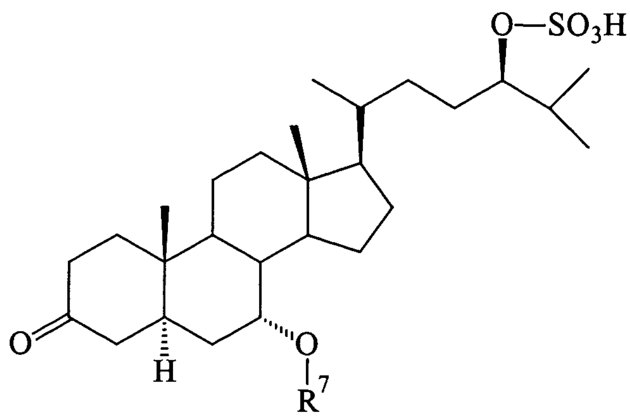
(134);

converting, under sufficient conditions, the compound according to formula 134 to a compound according to formula 135:



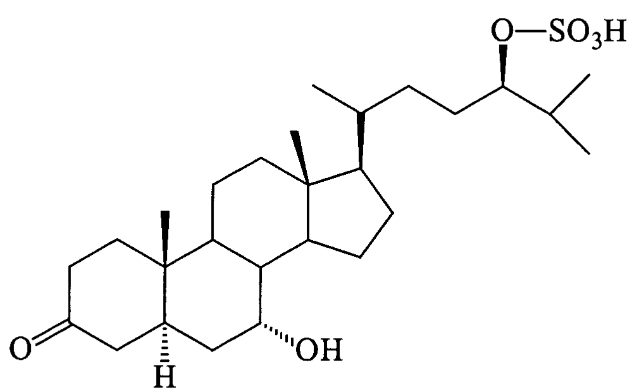
(135);

converting, under sufficient conditions, the compound according to formula 135 to a compound according to formula 136:



(136);

converting, under sufficient conditions, the compound according to formula 136 to a compound according to formula 37:



(37); and

converting, under sufficient conditions, the compound according to formula 37 to squalamine, compound 1436, or a salt thereof.

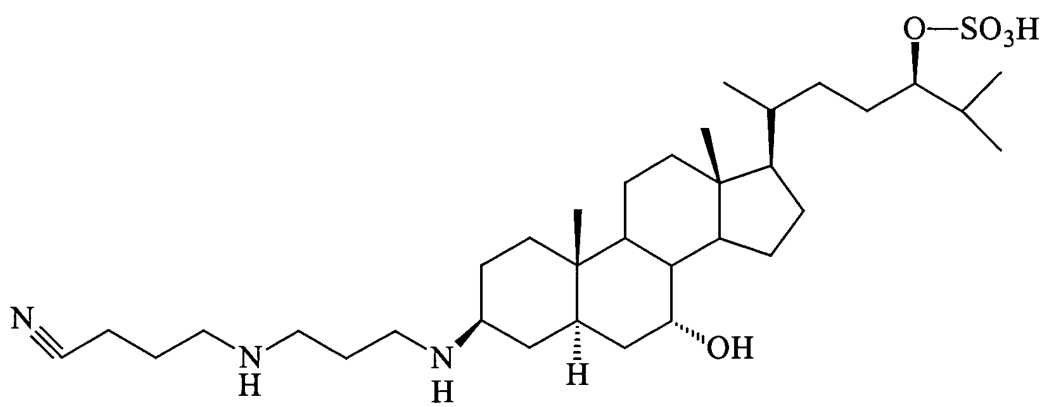
42. A method according to claim 41, wherein the compound according to formula 37 is converted into compound 1436 or a salt thereof.

43. A method according to claim 41, wherein the compound according to formula 37 is converted into squalamine or a salt thereof.

44. A method according to claim 43, wherein compound 37 is converted into squalamine as follows:

converting, under sufficient conditions, the compound according to formula 37 into its corresponding potassium salt;

converting, under sufficient conditions, the potassium salt of the compound according to formula 37 into a compound according to formula 43:

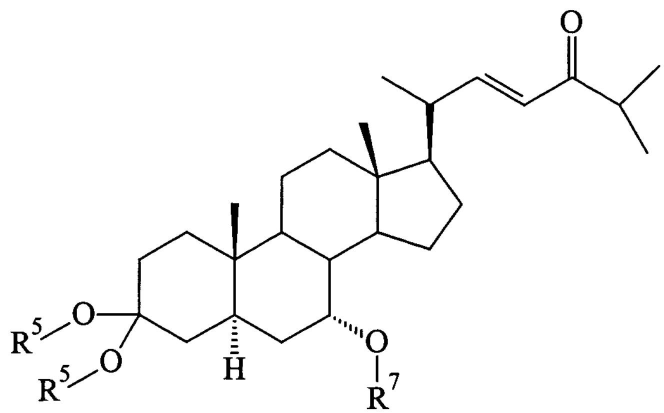


(43); and

converting, under sufficient conditions, the compound according to formula 43 to squalamine or a salt thereof.

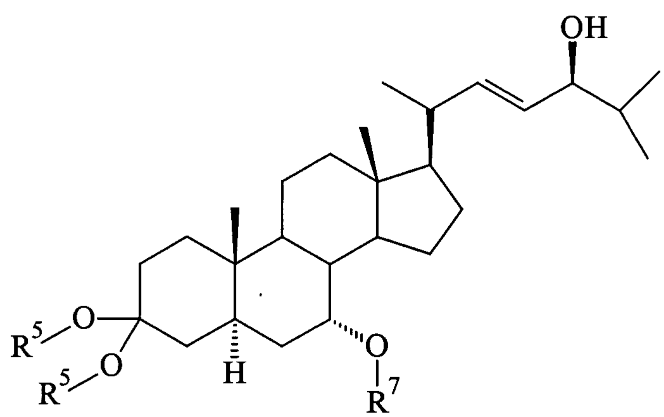
45. A method according to claim 41, wherein compound 129 is converted to compound 134 as follows:

converting, under sufficient conditions, the compound according to formula 129 to a compound according to formula 132:



(132);

converting, under sufficient conditions, the compound according to formula 132 to a compound according to formula 133:

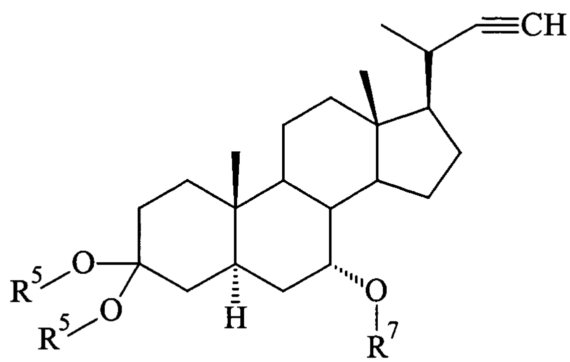


(133); and

converting, under sufficient conditions, the compound according to formula 133 to the compound according to formula 134.

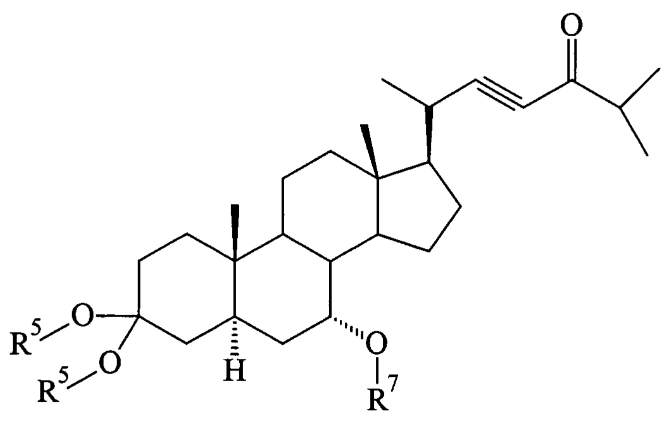
46. A method according to claim 41, wherein compound 129 is converted to compound 134 as follows:

converting, under sufficient conditions, the compound according to formula 129 to a compound according to formula 115:



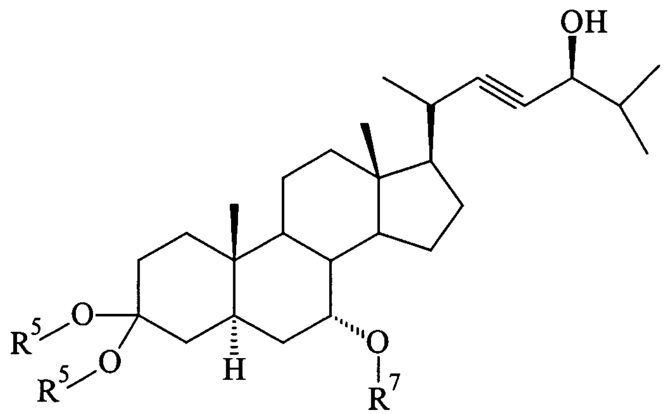
(115);

converting, under sufficient conditions, the compound according to formula 115 to a compound according to formula 116:



(116);

converting, under sufficient conditions, the compound according to formula 116 to a compound according to formula 117:

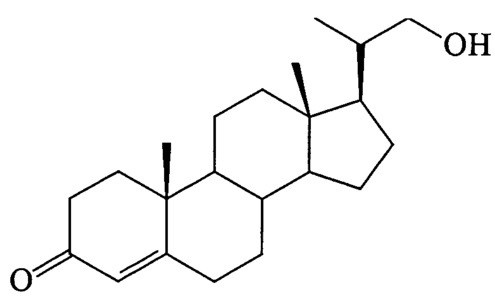


(117); and

converting, under sufficient conditions, the compound according to formula 117 to the compound according to formula 134.

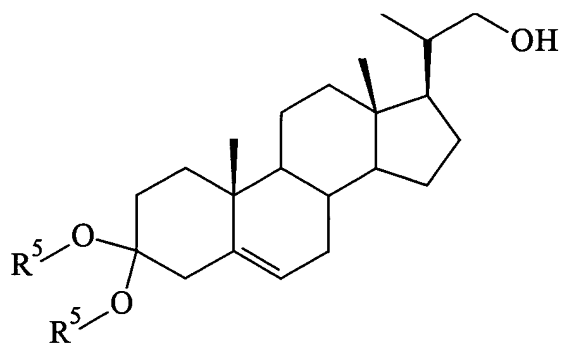
47. A method according to claim 41, wherein the compound according to formula 129 is produced as follows:

converting, under sufficient conditions, a compound according to formula 21 as follows:



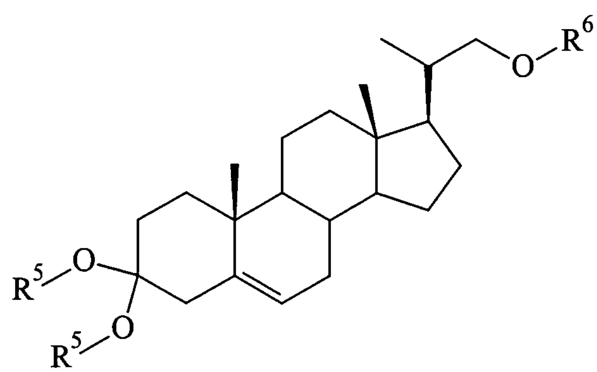
(21)

to a compound according to formula 122:



(122);

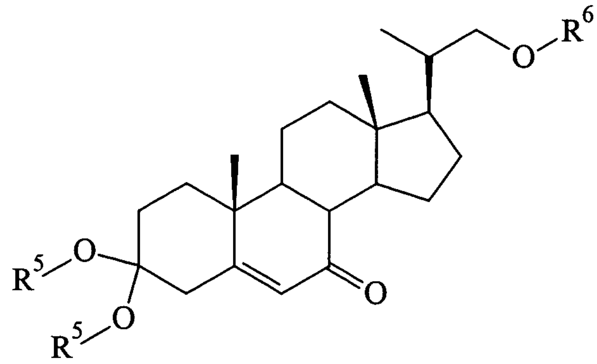
converting, under sufficient conditions, the compound according to formula 122 to a compound according to formula 123:



(123),

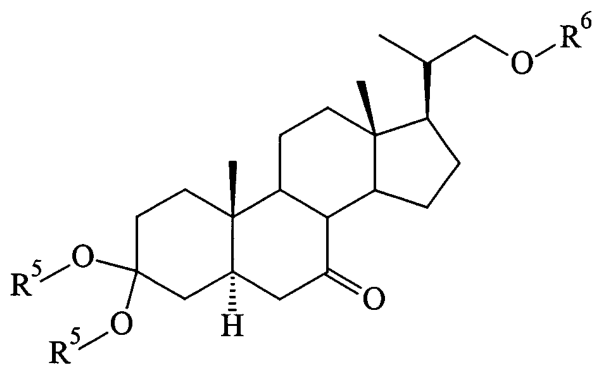
wherein R^6 is a suitable protecting group;

converting, under sufficient conditions, the compound according to formula 123 to a compound according to formula 124:



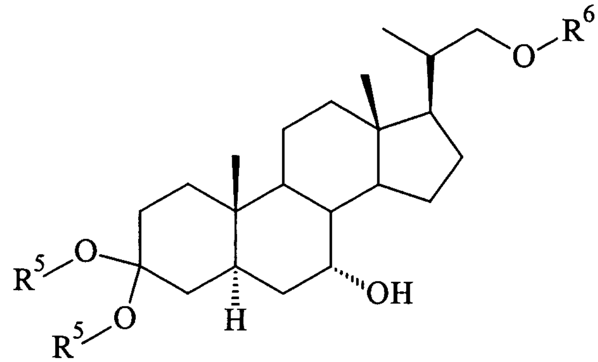
(124);

converting, under sufficient conditions, the compound according to formula 124 to a compound according to formula 125:



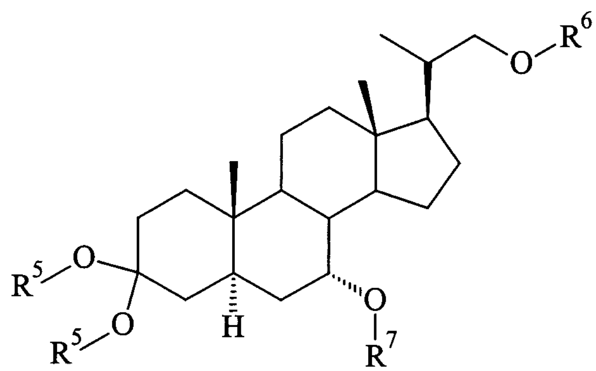
(125);

converting, under sufficient conditions, the compound according to formula 125 to a compound according to formula 126:



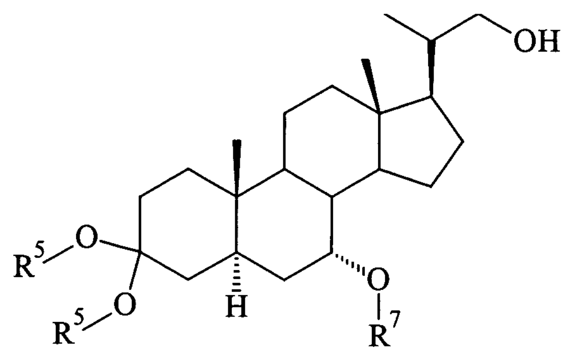
(126);

converting, under sufficient conditions, the compound according to formula 126 to a compound according to formula 127:



(127);

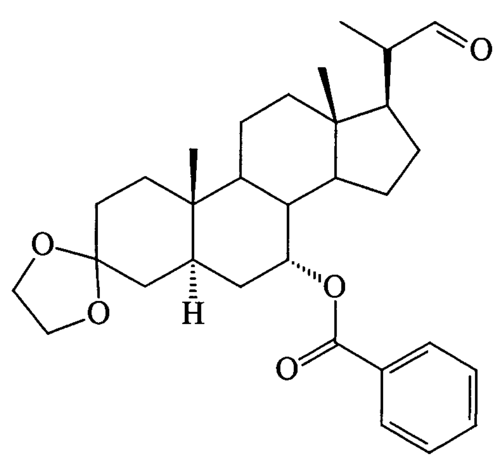
converting, under sufficient conditions, the compound according to formula 127 to a compound according to formula 128:



(128); and

converting, under sufficient conditions, the compound according to formula 128 into the compound according to formula 129.

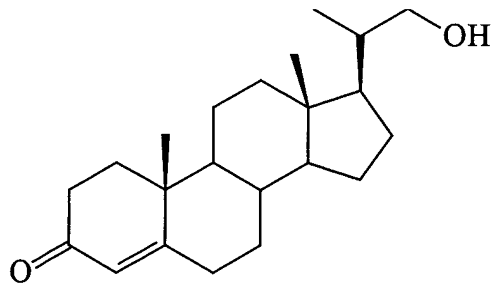
48. A method according to claim 41, wherein the compound according to formula 129 is a compound according to formula 29:



(29),

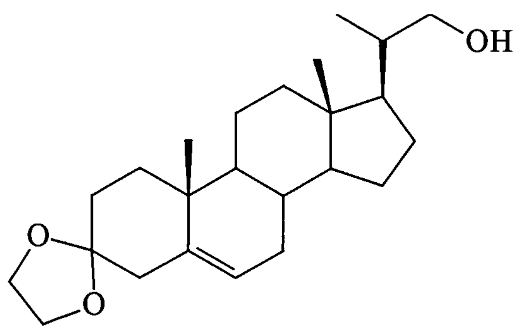
which is produced as follows:

converting, under sufficient conditions, a compound according to formula 21 as follows:



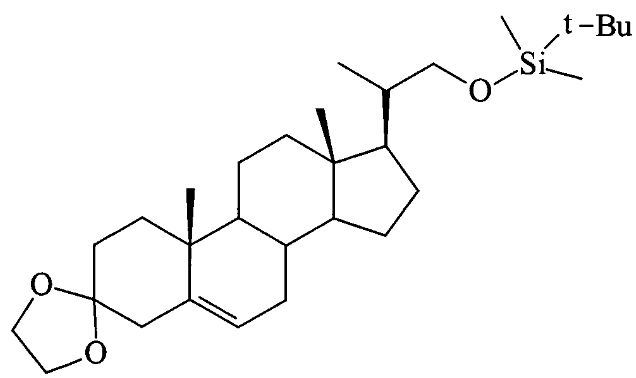
(21)

to a compound according to formula 22:



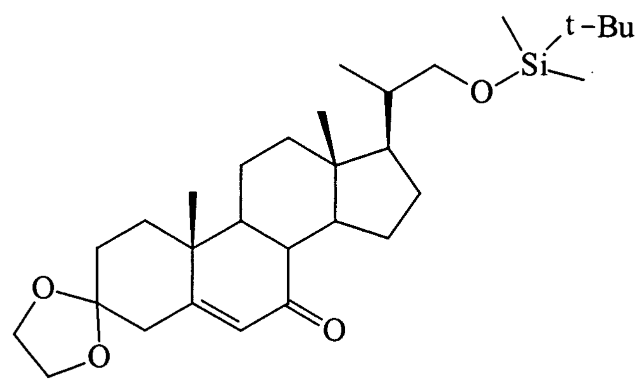
(22);

converting, under sufficient conditions, the compound according to formula 22 to a compound according to formula 23:



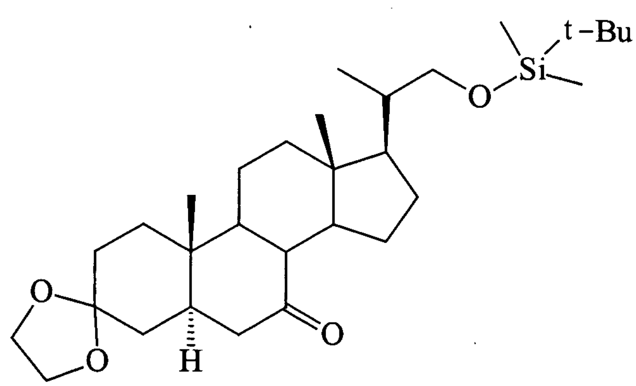
(23);

converting, under sufficient conditions, the compound according to formula 23 to a compound according to formula 24:



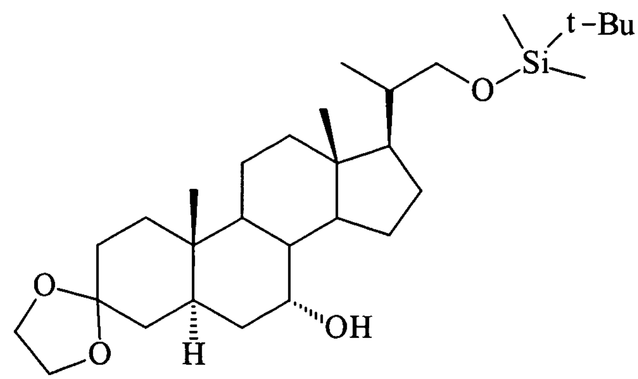
(24);

converting, under sufficient conditions, the compound according to formula 24 to a compound according to formula 25:



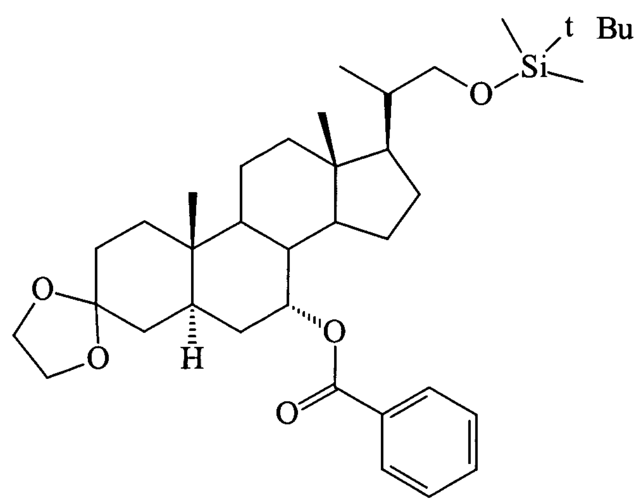
(25);

converting, under sufficient conditions, the compound according to formula 25 to a compound according to formula 26:



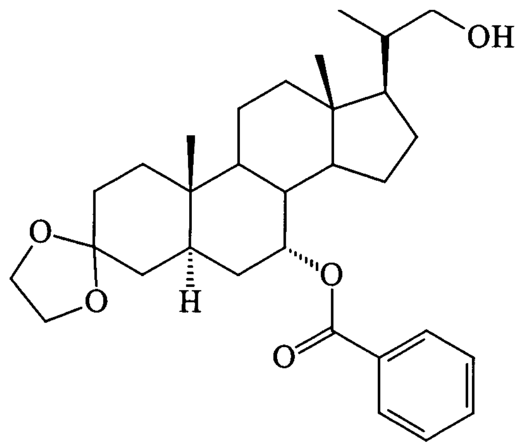
(26);

converting, under sufficient conditions, the compound according to formula 26 to a compound according to formula 27:



(27);

converting, under sufficient conditions, the compound according to formula 27 to a compound according to formula 28:

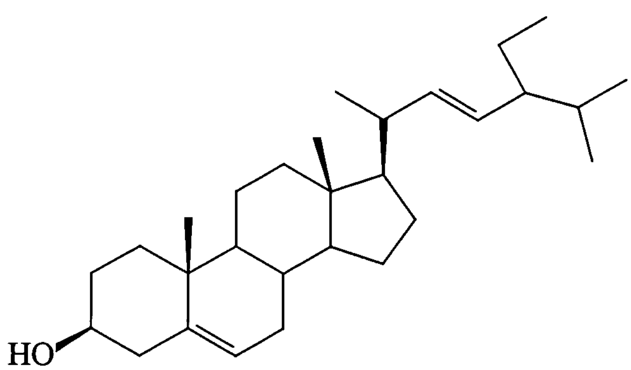


(28); and

converting, under sufficient conditions, the compound according to formula 28 into the compound according to formula 29.

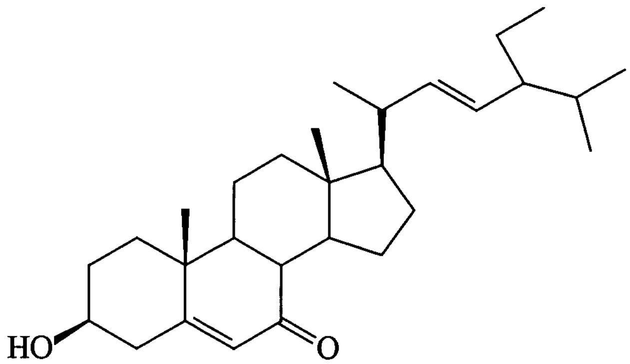
49. A method according to claim 41, wherein the compound according to formula 129 is produced as follows:

converting, under sufficient conditions, a compound according to formula 50 as follows:



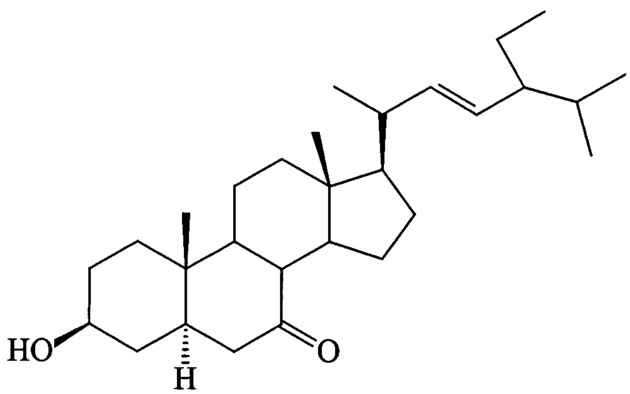
(50)

to a compound according to formula 60:



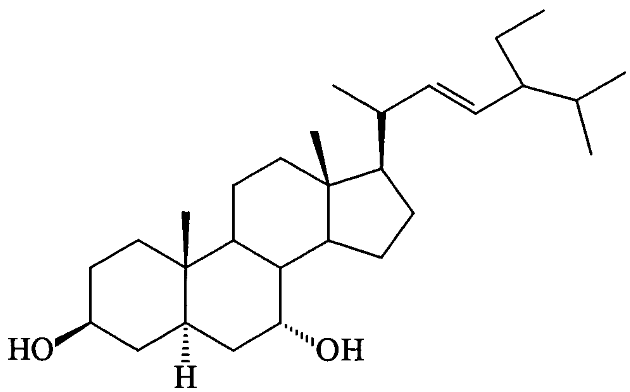
(60);

converting, under sufficient conditions, the compound according to formula 60 to a compound according to formula 61:



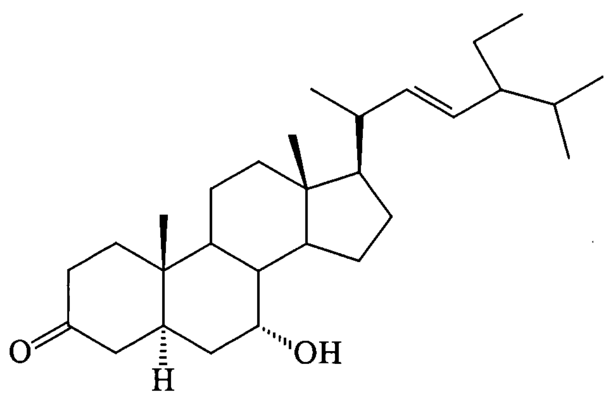
(61);

converting, under sufficient conditions, the compound according to formula 61 to a compound according to formula 62:



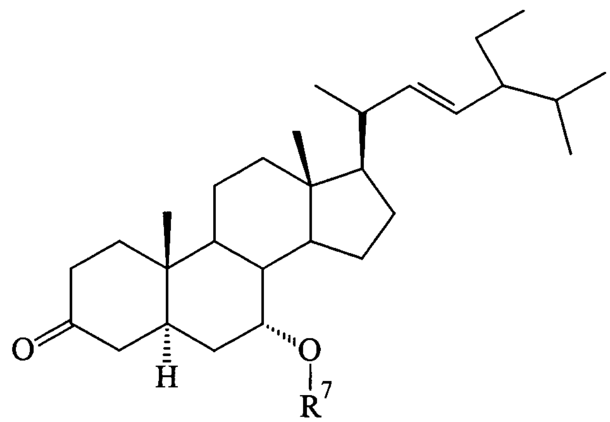
(62);

converting, under sufficient conditions, the compound according to formula 62 to a compound according to formula 63:



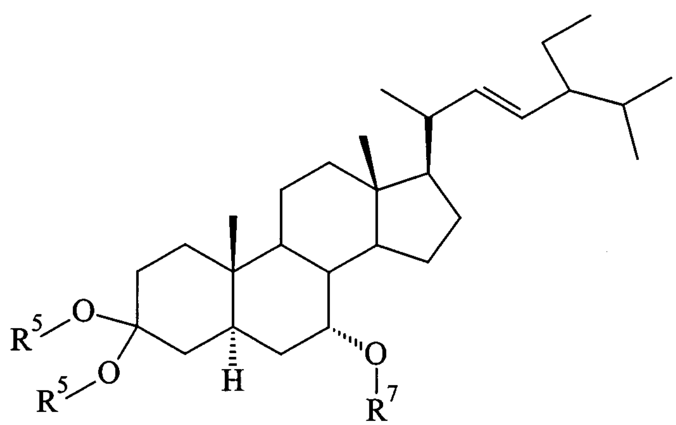
(63);

converting, under sufficient conditions, the compound according to formula 63 to a compound according to formula 164:



(164);

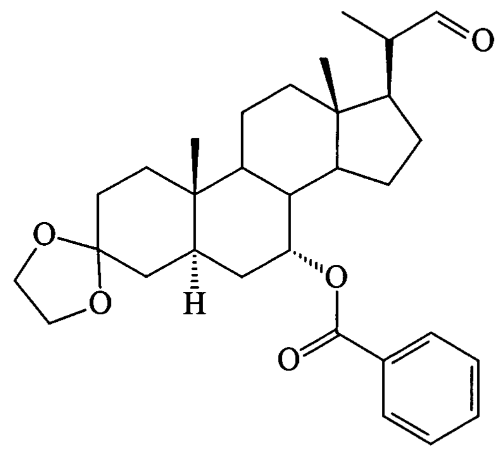
converting, under sufficient conditions, the compound according to formula 164 to a compound according to formula 165:



(165); and

converting, under sufficient conditions, the compound according to formula 165 to the compound according to formula 129.

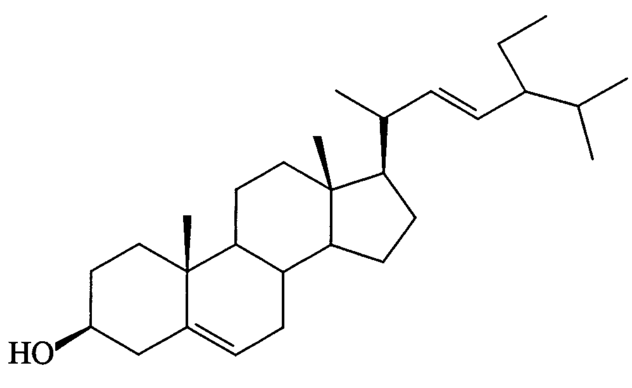
50. A method according to claim 41, wherein the compound according to formula 129 is a compound according to formula 29:



(29),

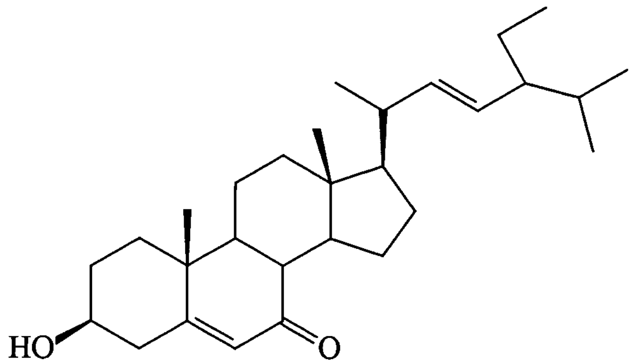
which is produced as follows:

converting, under sufficient conditions, a compound according to formula 50 as follows:



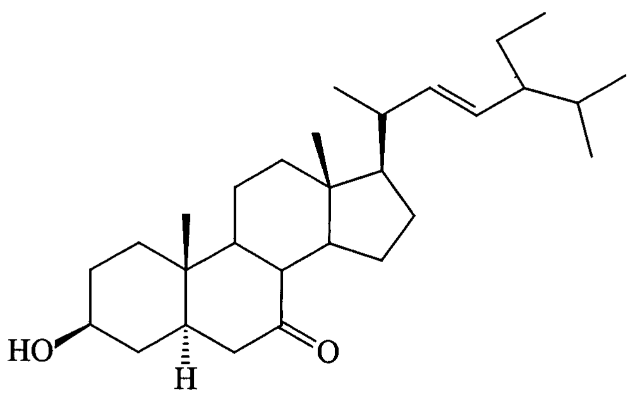
(50)

to a compound according to formula 60:



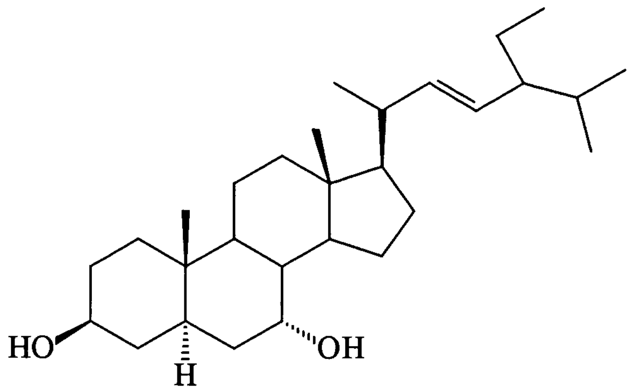
(60);

converting, under sufficient conditions, the compound according to formula 60 to a compound according to formula 61:



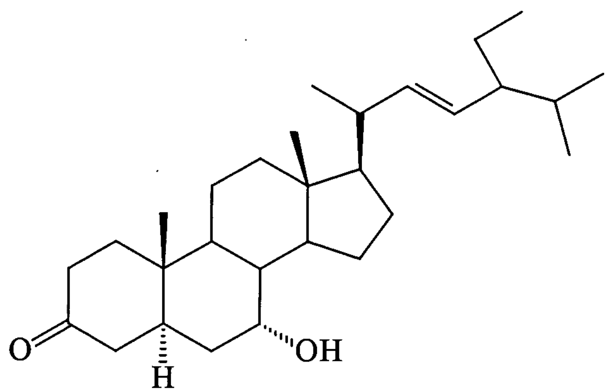
(61);

converting, under sufficient conditions, the compound according to formula 61 to a compound according to formula 62:



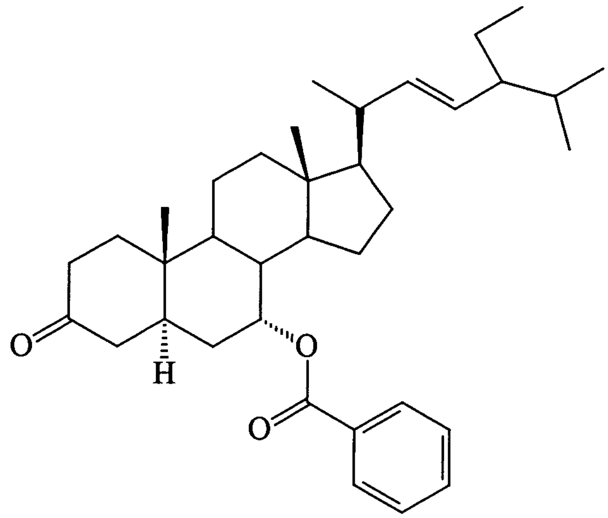
(62);

converting, under sufficient conditions, the compound according to formula 62 to a compound according to formula 63:



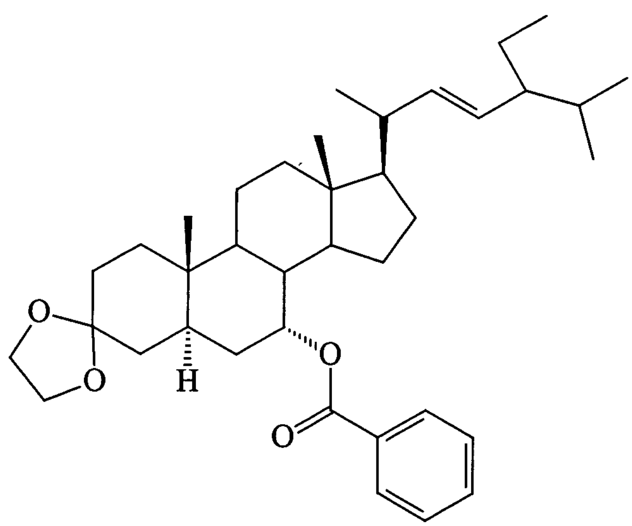
(63);

converting, under sufficient conditions, the compound according to formula 63 to a compound according to formula 64:



(64);

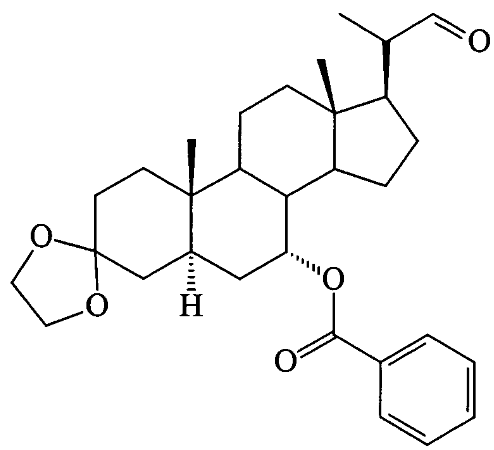
converting, under sufficient conditions, the compound according to formula 64 to a compound according to formula 65:



(65); and

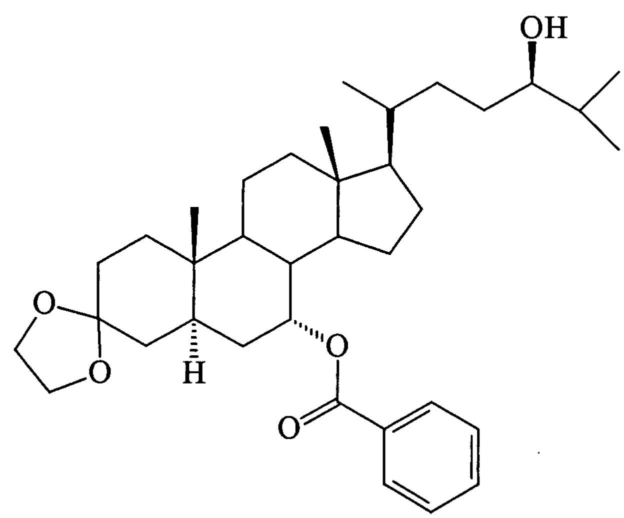
converting, under sufficient conditions, the compound according to formula 65 to the compound according to formula 29.

51. A method according to claim 41, wherein the compound according to formula 129 is a compound according to formula 29:



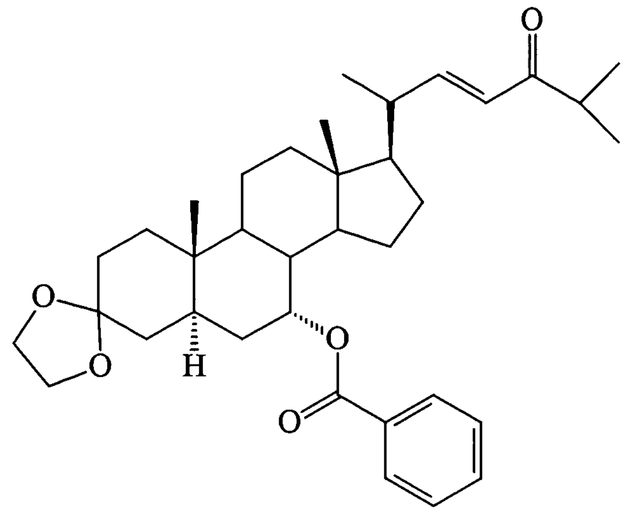
(29), and

the compound according to formula 134 is a compound according to formula 34:



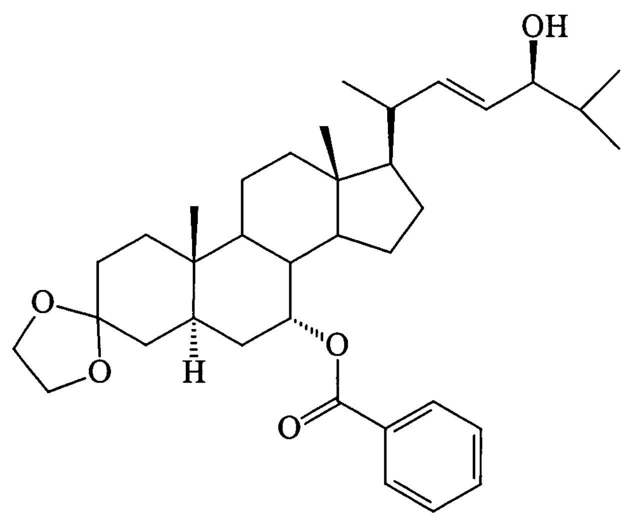
(34),

wherein the compound according to formula 34 is produced by converting the compound according to formula 29, under sufficient conditions, to a compound according to formula 32:



(32);

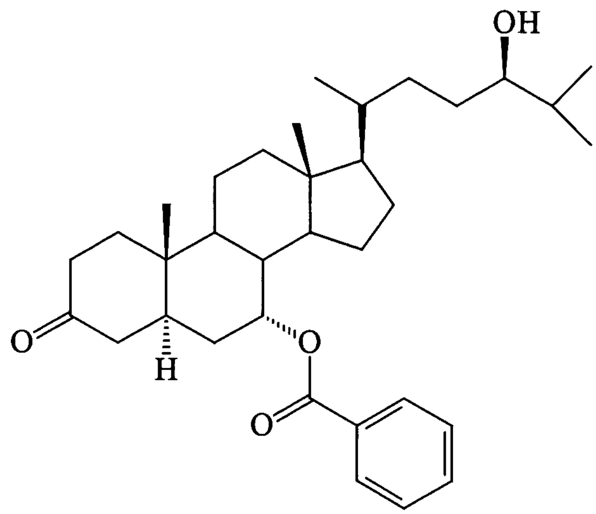
converting, under sufficient conditions, the compound according to formula 32 to a compound according to formula 33:



(33); and

converting, under sufficient conditions, the compound according to formula 33 to the compound according to formula 34.

52. A method according to claim 51, wherein the compound according to formula 135 is as follows:



53. A method according to claim 52, wherein the compound according to formula 136 is as follows: